

same; 18, cauda of same; 19, cornicle of same; 20, lateral view of 8th and 9th segments of same; 21, oviparous female; 22, antenna; 23, hind tibia and, 24, egg of No. 21. The enlargement is indicated with each figure. Original, Miriam A. Palmer, Illustrator.

NEW NEARCTIC CRANE-FLIES (TIPULIDÆ, DIPTERA) PART III.

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This paper is a continuation of the preceding articles under the same title (Can. Ent., vol. 48, p. 42-53, 1916; vol. 49, p. 22-31, 1917). The species here considered include a small number of subapterous forms, these belonging to the genera *Chionea*, *Limnophila*, and *Tricyphona*.

I am indebted to Mr. W. L. McAtee, Mr. R. C. Shannon, Mr. C. W. Johnson and other gentlemen mentioned in the paper. I am especially indebted to Mr. L. O. Jackson for specimens herein described. Unless stated otherwise, the types are in the collection of the author.

Subfamily *Limnobiinæ*.

Tribe *Limnobiini*.

Genus *Limnobia* Meigen.

***Limnobia indigena jacksoni*, subsp. n.**

Male.—Length 7.4 mm.; wing 8.8 mm.

Female.—Length 7.1 mm.; wing 7.6-8 mm.

Similar to typical *indigena* O. S. (Northeastern America), differing as follows:

The medial præscutal stripes are continuous and well-defined behind, the interspaces obscure, not bright yellow; pleura largely dark brown, this including also the outer faces of the coxæ. Wings similar, the ground-colour more grayish, the brown clouds less distinct and more extensive, pale grayish brown; these markings include a broad, continuous seam along and slightly before the cord and the apex of the wing; basal deflection of vein *Cu*₁ close to the fork of *M*. Abdominal tergites with the cross-bands poorly defined, the sternites suffused with brownish.

June, 1917.

Holotype, ♂, Geneva Park, Grant, Colorado, altitude 10,000 feet, July 16, 1916 (L. O. Jackson).

Allotopotype, ♀, July 21, 1916.

Paratopotype, ♀, altitude 9,500 feet, July 22, 1916.

This fly will probably be found to be a valid species. It differs from *indigena* in the dusky brown body coloration, the gray wings with a more extensive brown seam, the position of the basal deflection of *Cu*₁, etc.

Tribe *Eriopterini*.

Genus *Erioptera* Meigen.

***Erioptera* (*Empeda*) *cinereipleura*, sp. n.**

Male.—Length 4 mm.; wing 4.5 mm.

Similar to *E. stigmatica* O. S. (Northeastern America) but the body-coloration clearer gray throughout. Antennæ darker, brown, the male with very long verticils.

Mesonotal præscutum gray, the pseudosutural foveæ and the tuberculate pits large and conspicuous, black, the latter closely approximated, separated by a distance less than the diameter of one. Pleura clear light gray, not reddish gray as in *stigmatica*. Legs with the femora yellowish basally, soon passing into brown. Wings grayish subhyaline, the stigma clear but distinct (fig. 6).

Abdominal tergites dark brown, contrasting with the yellow hypopygium.

Holotype, ♂, Hall Valley, Colorado, August 11, 1915 (E. J. Osler).

***Erioptera* (*Empeda*) *noctivagans*, sp. n.**

Wings pale dusky with an indistinct brown seam along the cord.

Male.—Length 3.2 mm.; wing 4.7 mm.

Female.—Length 3.8–4.1 mm.; wing 5.6–5.8 mm.

Male.—Rostrum and palpi black. Antennæ black, the second and third antennal segments enlarged, the flagellum without exceedingly elongated verticils as in *stigmatica*, *cinereipleura*, etc. Head dark gray.

Thorax grayish brown, the humeral portions bright yellow; præscutum before the pseudosutural foveæ slightly brightened. Pleura and sternum dark coloured with a sparse, gray pruinosity;

pleural membranes yellowish brown. Halteres yellow. Legs with the coxæ and trochanters yellowish, remainder of the legs brown. Wings dusky gray, the stigma distinct; an indistinct, brown seam along the cord; veins dark brown. Venation as in fig. 5.

Abdomen light brown with a broad, blackish, sublateral stripe on either side of the tergites; hypopygium small, brownish yellow; sternites brown.

Female.—Slightly larger than the male, the basal segments of the antennæ not so enlarged; flagellar segments oval, those toward the tip more attenuated; humeral portions of the thorax whitish yellow; abdominal tergites with the sublateral stripes somewhat narrower; tergal valves of the ovipositor pointed at their apices.

Holotype, ♂, Maywood, Alexandria Co., Virginia, October 19, 1915, (W. L. McAtee); at light.

Allotopotypes, ♀, October 15, 1915.

Paratopotypes, 2 ♀s, October 16–19, 1915.

Type in the collection of the United States Biological Survey.

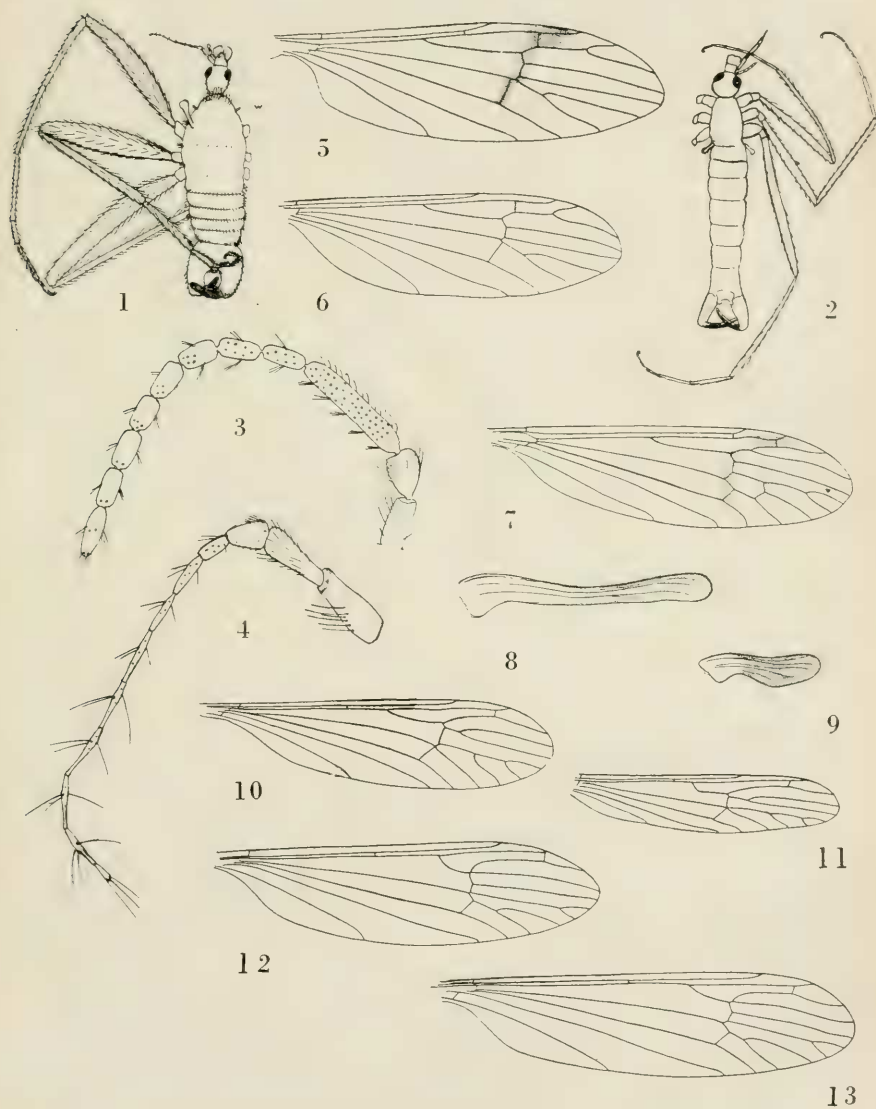
A key to the nearctic species of the genus Erioptera (Empeda).

1. Cell 1st M_2 closed; body-coloration yellow.....2.
- Cell 1st M_2 open; body-coloration gray or brown.....3.
2. Basal deflection of Cu_1 beneath the middle of cell 1st M_2 ; vein R_2 oblique, diverging strongly from vein R_3 (Eastern United States).....*nyctops* Alex.
- Basal deflection of Cu_1 before the fork of M ; vein R_2 not oblique, running parallel with vein R_3 (Western United States).....*alicia* Alex.
3. Wings gray with an indistinct, brown seam along the cord; verticils of the male antennæ not greatly elongated (Eastern United States).....*noctivagans*, sp. n.
- Wings subhyaline without a brown seam along the cord, only the stigmal region slightly darkened, verticils of the male antennæ greatly elongated.....4.
4. Body-coloration clear gray, including the thoracic pleura (Rocky Mt. Region).....*cinereipleura*, sp. n.
- Body-coloration reddish brown, the pleura reddish gray (Northeastern United States).....*stigmatica*, O. S.

Chionea Dalman.

These interesting subapterous crane-flies have been the subject of much discussion during the past hundred years. They were long supposed to be wingless but this is incorrect, the wings being present although greatly reduced (see fig. 1, *w*). The legs of the males of many species are strongly incrassated and hairy. The evolution of the group from full-winged ancestors has been indicated by the author in another paper (Proceedings Academy Natural Sciences of Philadelphia, p. 529, 530; 1916). The closest known relative of *Chionea* I believe to be the full-winged *Pterochionea bradleyi* Alexander (British Columbia), a fly that is interesting and suggestive in many ways. Its structure may be compared with that of *C. primitiva*, sp. n., when the relationships existing will be better understood.

The antennæ of *Pterochionea*, unlike the normal eriopterine crane-flies, have undergone a reduction in the number of the antennal segments, this reduction being brought about by a curious fusion of the five basal segments of the flagellum (fig. 3), that has been termed the fusion-segment. In *Pterochionea* this fusion-segment is elongated and the five sets of verticils are well-preserved. In *Chionea*, and, to a lesser extent, in *Crypteria* Bergroth, the fusion-segment has shortened up into a conical structure that is scarcely longer than the succeeding flagellar segment, and the five sets of verticils are either lost or very reduced. Beyond the fusion-segment in *Pterochionea*, *Crypteria* and *C. primitiva*, there are nine flagellar segments, thus accounting for the sixteen segments of the normal eriopterine organ. In order to determine, if possible, how the further reduction in segments in *C. valga*, *C. nivicola* and the other species had been brought about, Mr. C. W. Johnson has very kindly examined the types and fresh metatypical specimens of *C. valga* Harris in the collection of the Boston Society of Natural History. Under the date of March 11, 1917, he writes in part: "Under the binocular and with a fresh specimen I seem to see traces of segmentation in the three conspicuous joints of the flagellum, with 12 verticils and bristles, showing, as you say, nine. In the old specimens, including the type, I cannot make out clearly the weaker segmentation, but the verticils seem to be the same; all of the specimens have the three long bristles on the



terminal segment, one a little below the apex." The sketch supplied by Mr. Johnson indicates that the first of the flagellar segments has two of these weak segments, the next two have three each while the short terminal segment is not further divided, these totalling up to the nine distinct segments in *C. primitiva*. It will be seen from the figures (fig. 3) that the flagellar segments in *Pterochionea* are all short-cylindrical; in *C. primitiva* (fig. 4) the basal segments are short with short verticils, these segments gradually becoming more attenuated and provided with longer bristles, the last segment shorter with three terminal bristles.

The male hypopygia of *Chionea* and *Pterochionea* show a peculiar, powerful type of genitalia, consisting of a massive pleurite and a single elongate pleural appendage (figs. 1, 2). In *Crypteria* the appendages are small, two in number and quite normal. Thus in the structure of the antennæ, *Chionea* comes closest to *Crypteria*, but in the hypopygium the condition is remarkably close to *Pterochionea*. There can be little doubt but that these two genera, with perhaps others yet to be discovered, are the direct ancestors of our familiar snow-flies, *Chionea*. As stated in another paper, this interpretation will place the group at the very end of the eriopterine series.

***Chionea primitiva*, sp. n.**

Size large; form stout; entire body hairy; head elongated; antennæ with nine flagellar segments beyond the fusion segment.

Male.—Length 5.8 mm.; diameter across thorax, 1.5 mm.

Mouth parts yellowish brown; palpi dark brown. Antennæ elongate, the scapal segments yellowish brown, the flagellum darker; first segment of the scape a little broader basally, with a group of long bristles on the outer face; second segment narrowed, basally enlarged, darkened and provided with bristles beyond the basal portion; fusion-segment of the flagellum conical, with short verticils; it is shorter than the second segment of the scape but longer than the following segment of the flagellum; beyond the fusion-segment are nine distinct segments, increasing in length toward the tip of the organ, the verticils also increasing in length from the base outward, those of the first four segments shorter than the segments that bear them, the others very long, longer than the segments that bear them; the terminal segment is smaller,

enlarged apically and bearing at its tip three very long bristles. The frontal prolongation of the head bears a group of about eight stout bristles. The head behind the eye is large, elongated and prominent, bearing many strong verticils. Head yellowish.

Thorax reddish yellow, the region of the mesonotal scutum and scutellum with abundant strong black bristles. Halteres prominent, light yellow. Legs with all the femora enlarged, yellowish; tibiae yellow; tarsi black. Wings very small but evident (fig. 1, w) about as long as the third flagellar segment of the antennae.

Abdomen stout, the tergites with their caudal portions provided with abundant long, black bristles; sternites with similar but shorter hairs. Male hypopygium powerful, the pleurites stout, the appendage enlarged basally and provided with an inner basal tooth, in the angle of which is a tuft of stout, black hairs; the appendage is shorter than the pleurite.

Holotype, ♂, Cascade, Owasco Lake, Cayuga Co., New York, November 15, 1915 (Bishop and Crosby).

***Chionea noveboracensis*, sp. n.**

Body-coloration dark brownish gray; ovipositor of the female very elongated.

Female, somewhat shrunken, length about 3.5 mm.

Mouth parts and palpi brownish black. Antennae black, the fusion-segment of the flagellum short; remainder of the flagellum broken. Head very dark brown with a gray pruinosity and numerous dark bristles.

Thorax brownish gray. Halteres elongate, brownish yellow. Wings very small but evident, dusky gray. Legs with the coxae prominent, dark brown; femora and tibiae brown, the tarsi dark brown; femora not incrassated.

Abdomen very dark brown with a gray bloom, the tergites with long, golden hairs on the caudal portion. Female ovipositor exceedingly long and slender, the tergal valves much longer than the sternal pair, slightly upcurved, narrowed and obtuse at their tips. The tergal valves of the ovipositor are about as long as the thorax.

Holotype, ♀, Coy Glen, Tompkins Co., New York, altitude 800 feet, Feb. 25, 1917 (R. C. Shannon).

The type is in the collection of the collector.

***Chionea gracilis*, sp. n.**

Size small; form very long and slender; head round; femora not swollen.

Male.—Length 3.9 mm.; diameter across the thorax, .6 mm.

Mouth parts and palpi yellowish. Antennæ yellow, the scapal segments long and slender, the flagellar fusion-segment long and slender, conical. Head rounded, yellowish.

Thorax brownish yellow. Halteres yellow. Legs yellow, the tarsi scarcely darkened.

Abdomen long and slender, about twice the length of the combined head and thorax. Male hypopygium not conspicuously enlarged, the pleurites slender, the appendage very long and slender, curved, narrowed at the tip and nearly as long as the pleurite.

The body and legs are provided with a sparse covering of short, pale hairs.

Holotype, ♂, Ithaca, Tompkins Co., New York, December 21, 1914.

The description of *C. scita* Walker indicates a form that is longer than *C. valga* Harris (*aspera* Walker) and having black antennæ. It seems probable that *C. scita* is the female of *C. valga*, the females of *Chionea* having the legs more slender than those of the male, and with the body more elongate and slender (see Emerton's figures, in Johnson's paper, "The Snow-fly, *Chionea valga* Harris," *Psyche*, vol. 14, p. 43; 1907).

A key to the Eastern American species of the genus Chionea.

1. Body-coloration gray.....*noveboracensis*, sp. n.
Body-coloration reddish or yellowish.....2.
2. Form long and slender; (length of the male less than 4 mm.; diameter across the thorax about .6 mm.); all the legs elongate, slender, not at all thickened.....*gracilis*, sp. n.
Form stouter; (length of the male over 4 mm.; diameter across the thorax 1 mm. or over); at least the posterior legs of the male incrassated.....3.

3. Antennæ with 12 segments; all the femora of the male incrassated; size larger, (length of the male about 6 mm.; diameter across the thorax 1.5 mm.).....*primitiva*, sp. n.
Antennæ with 7 segments; the hind femora of the male conspicuously incrassated; size smaller (length of the male about 5 mm.; diameter across the thorax about 1 mm.).....*valga* Harris

Tribe *Limnophilini*.

Genus *Limnophila* Macquart.

***Limnophila subaptera*, sp. n.**

Subapterous; wing of the male longer than the halter.

Male.—Length about 12 mm.; wing 2.5 mm.

Rostrum and palpi dark brown. Antennæ dark brown, apparently with only 15 segments; segments of the flagellum short-oval with stout, black bristles and a sparse, white pubescence. Head grayish with scattered yellowish bristles.

Thoracic dorsum grayish with three indistinct grayish brown stripes, the lateral pair running back on to the scutum; sides of the scutellum yellowish. Pleura gray, the dorso-pleural membranes brownish yellow. Halteres brown, paler basally. Legs long and slender; outer faces of the coxæ grayish except the fore coxæ which are pale yellow; femora pale at the extreme base, the remainder dark brown; tibiæ brownish yellow, the apices darker brown; tarsi brown. Wings subatrophied, long and narrow, longer than the halteres (fig. 8), pale basally, darker brown apically.

Abdomen long and slender, brownish gray, the segments narrowly and indistinctly margined with paler; hypopygium with golden-yellow hairs.

Holotype, ♂, South Fork of the Kaweah R., California, below 5,000 feet, July 25, 1915, (J. Chester Bradley).

Type in the collection of Cornell University.

Similar to *L. aspidoptera* Coquillett (New Mexico) and like this species having apparently but 15 antennal segments, the reduction being brought about by the fusion or very close approximation of the last two segments; the three basal antennal segments in *aspidoptera* are the more brightly coloured. The most obvious difference is in the elongate wings of the present species, these

being about one and one-half times the length of the halteres; in *aspidoptera* (fig. 9) the wings are short and broad, and extend to about two-thirds the length of the halteres.

***Limnophila (Prionolabis) cressoni*, sp. n.**

Dark brown with the thoracic stripes indistinct; wings with narrow, grayish brown seams to the cross-veins and deflections of veins.

Male.—Length 8 mm.; wing 10.6 mm.

Female.—Length 10 mm.; wing 10.8 mm.

Rostrum short, dark brown; palpi dark brown. Antennae short, dark brown; the flagellar segments very short, almost rounded, with an abundant white pubescence. Head gray.

Thoracic dorsum dark brown with a sparse, yellowish gray bloom, the prescutal stripes poorly defined. Pleura clearer gray, the dorsal-pleural membranes brownish. Halteres dull yellow, the knobs a little darker. Legs with the coxae and trochanters dull brownish yellow, darkened toward their apices, this dark tip broadest on the fore and middle femora, narrowest on the hind femora; tibiae brown, the tips narrowly dark brown; tarsi brown. Wings with a pale, brown suffusion; stigma dark brown; broad, grayish brown seams along the cord, the outer end of cell *1st M*₂ and at the origin of the sector. Venation (fig. 7) R_{2+3} about as long as the basal deflection of *Cu*₁.

Abdomen brown, the terminal segments darker. Hypopygium of the male with the ninth tergite having a broad, V-shaped median notch that is bordered with pale reddish brown; ventral pleural appendage with a few scattered teeth that are not prominent.

Female quite similar to the male, the ovipositor with elongate, acute, nearly straight tergal valves; sternal valves elongate, only a little shorter than the tergal pair.

Holotype, ♂, Lagunitas Canyon, Marin Co., California, March 29, 1908, (E. T. Cresson, Jr.).

Allotopotype, ♀.

The types are in the collection of the American Entomological Society, Philadelphia.

This fly differs from the only described regional member of

the subgenus (*L. barberi* Alex.) in its larger size and different coloration.

Tribe *Pediciini*.

Genus *Tricyphona* Zetterstedt.

***Tricyphona degenerata*, sp. n.**

Cell *1st M*₂ of the wings open by the atrophy of the outer deflection of vein *M*₃; wings small, somewhat degenerate, in the male less than 5 mm. in length.

Male.—Length about 4.8 mm.; wing 3.8 mm.

Head lacking in the type.

Pronotum light yellow. Mesonotum yellowish, the praescutum with a broad, dark brown, median stripe and shorter lateral stripes that continue back on to the anterior half of the scutal lobes; scutellum and the remainder of the scutum yellow; postnotum with a very sparse, grayish pruinosity. Halteres pale, the knobs a little darkened. Legs with the coxae elongated, dull yellowish; trochanters yellow, the margin at the junction with the femora darkened; femora and tibiae brownish yellow the tips of the latter narrowly darkened; last two tarsal segments and the claws dark. Wings long and slender, small, degenerate, although with a complete venation; pale yellowish subhyaline, the veins yellowish brown; stigma indistinct. Venation (fig. 11) *Rs* angulated at its origin; cross-vein *r* about two-thirds the length of that portion of *R*₁ beyond it; petiole of cell *R*₄ longer than the *r-m* cross-vein; forks of *M* subacute; cell *1st M*₂ open by the atrophy of the outer deflection of *M*₃.

Abdomen dark brown, the hypopygium more reddish brown.

Holotype, ♂, Geneva Park, Grant, Colorado, altitude 9,500–10,000 feet, July 22, 1916, (E. C. Jackson).

The only other *Tricyphona* in the Nearctic fauna with the cell *1st M*₂ open by the atrophy of the outer deflection of vein *M*₃, is *T. aperta* Coq. (fig. 10), a full-winged fly that is much larger than our present species. A comparison of figures 10 and 11 will show the chief differences between the species. The condition in the present species is one of degeneration, the wing measuring but 3.8 mm.; the even more degenerate *T. hannai* Alex. (Pribilof Islands) represents the culmination of this tendency in the known species of the genus.

Genus *Rhaphidolabis* O. S.**Rhaphidolabis (*Rhaphidolabis*) sessilis**, sp. n.

Size large (wing of the female over 8.5 mm.); body-coloration gray, the mesonotal præscutum with three dark brown stripes; wings with the cross-vein *r* at the tip of *R*₁; cell *R*₂ sessile or sub-sessile.

Female.—Length 6.8 mm.; wing 8.8 mm.

Rostrum and palpi dark brown. Antennæ brownish, the scape with a gray bloom; flagellar segments oval, dark brown. Head gray.

Mesonotum light gray, the præscutum with three dark brown stripes of which the median one is slightly darker and broader, becoming obsolete just before the transverse suture; lobes of the scutum brownish. Pleura gray, the dorsol-pleural membranes more brownish. Halteres pale, the knobs brown. Legs with the coxæ dull yellow, the outer faces with a gray bloom that is heaviest on the hind coxæ; remainder of the legs dark brown, the femora brightened basally. Wings with a pale gray suffusion, highly iridescent; stigma light brown; veins brown. Venation (fig. 12) *Rs* short, strongly arcuated; cross-vein *r* at the very tip of *R*₁; cell *R*₂ sessile or very short-petiolate.

Abdomen dark brown; valves of the ovipositor strongly reddish yellow.

Holotype, ♀, Hall Valley, Colorado, August 11, 1915, (E. J. Oslar).

This fly is readily separated from all the described species (see the author's key to the Nearctic species of the genus, *Proceedings Academy Natural Sciences Philadelphia*, p. 541, 542, 1916), in its large size and the position of the radial cross-vein.

Rhaphidolabis (*Rhaphidolabis*) major, sp. n.

Size large (wing of the female over 9 mm.); body-coloration pale brown, the præscutum with a broad, dark brown median stripe.

Female.—Length 7.8 mm.; wing 9.4 mm.

Rostrum yellowish brown, the palpi dark brown. Antennæ dark brown. Head brownish gray.

Pronotum light brown, darker brownish medially. Mesonotal

præscutum light fawn-brown with a very dark brown median stripe and much paler lateral vittæ; the conspicuous median stripe is broadest in front, gradually narrowed behind, ending before the transverse suture and narrowly bisected behind; lateral præscutal stripes and the lobes of the scutum paler brown; remainder of the scutum, the scutellum and postnotum reddish yellow, the latter browner on the caudal half. Pleura pale reddish brown, very sparsely dusted with whitish. Halteres yellow, the knobs brown. Legs with the coxæ dull yellow; trochanters similar, their margins blackened; femora dull yellow, the tips narrowly brown; tarsi dark brown. Wings yellowish gray subhyaline, strongly iridescent; stigma very pale; veins dark brown. Venation (fig. 13) *Rs* long, almost straight; cross-vein *r* removed from the tip of vein *R*₁ to a distance about equal to its own length; *R*₂₊₃ shorter than the radial cross-vein.

Abdomen grayish brown with a reddish cast that is best defined on the caudal margins of the terminal sternites; ovipositor reddish yellow.

Holotype, ♀, Horseman Creek, Geneva Park, Grant, Colorado, altitude 10,200 feet, July 19, 1916, (L. O. Jackson).

This is the largest species of the genus.

EXPLANATION OF PLATE XII.

Fig. 1. *Chionea primitiva*, sp. n.; ♂, legs of the right side not figured; *w* = wing.

Fig. 2. *C. gracilis*, sp. n.; ♂, dorsal aspect, legs of the left side not figured.

Fig. 3. Antenna of *Pterochionea bradleyi* Alexander; ♂.

" 4. The same, *Chionea primitiva*; ♂.

" 5. Wing of *Erioptera noctivagans*, sp. n.; ♂.

" 6. " *E. cinereipleura*, sp. n.; ♂.

" 7. " *Limnophila cressoni*, sp. n.; ♀.

" 8. " *L. subaptera*, sp. n.; ♂.

" 9. " *L. aspidoptera* Coquillett; ♂.

" 10. " *Tricýphona aperta* Coquillett; ♂.

" 11. " *T. degenerata*, sp. n.; ♂.

" 12. " *Rhaphidolabis sessilis*, sp. n.; ♀.

" 13. " *R. major*, sp. n.; ♀.